

II. SPECIFICATION AMENDMENTS

Please replace the title on page 1, line 1 as rewritten below:

MICROBEAD COMPOSITIONS

Please replace the paragraph beginning on page 1, line 6, through page 1, line 19 as rewritten below:

The present invention relates to improved compositions containing glass beads having an average diameter up to about 20 microns, which are preferably coated to improve their dry flowability and to reduce their wet-out capability. These properties within resinous binder materials affect microparticle bonding properties within plastic coatings, paints, and similar compositions. This invention also relates to methods for producing compositions for producing resinous bodies which contain coated particles that are more tightly bonded within the composition, resulting in compositions having improved bonding properties for substrates.

Please replace the paragraph beginning on page 1, line 23 through page 2, line 6 as rewritten below:

The present invention is concerned with improving the adhesion or bonding properties of microparticles such as glass beads, and color-enhancing materials within compositions, and improving the adhesive or bonding properties of such compositions for substrates such as metal automobile bodies, appliances, etc. Particles

of such materials normally have a surface affinity and attraction for each other, particularly in the presence of moisture, so that they have poor flowability properties in bulk, such as from within a container. This results in the particles forming clusters, agglomerates or build-ups of a plurality of flakes, beads or other particles, which interfere with their handling properties, metering properties and the aesthetic nature of the particles for their desired characteristics, such as color uniformity, light reflection or refraction and similar properties, as well as avoidance of significant reduction in impact strength caused by the addition of agglomerates to plastics.

Please replace the paragraphs beginning on page 4, line 20 through page 7, line 18 as rewritten below:

The present invention relates to providing novel microbead compositions having improved binding properties for the glass microbeads suspended therein, which compositions also have superior bonding properties for substrates so as to be resistant to peeling or flaking therefrom after drying. According to the present invention these novel binding and bonding properties are unexpectedly produced by the addition of microparticles of ground rubber to microbead compositions containing a resinous binder material and, optionally, other color-enhancing particles such as pigments, glass flakes, metallic flakes, mica and similar materials as disclosed in co-

pending USSN 09/752,305, discussed supra. The rubber particles, known as crumb rubber and pelletized rubber are commercially-available from Spreerelast GmbH, Ardennering, Germany under the trademark "RELASTON" ® MT and DT (devulkanized) having grain or particle sizes of 100 μ , 120 μ , 150 μ , 160 μ , 180 μ , and larger. The rubber particles are produced cryogenically by freezing and grinding scrap tire rubber elastomer to the desired grain size and smooth surface. Particles having a grain size of 150 μ or less are suitable for use in the present compositions. They have the appearance of a powder and are black in color.

The rubber particles are effective in amounts between about 2% up to about 40% by weight of the total solids content of the composition, more preferably between about 5% and 20%. The darkish color and opacity of the rubber particles reduces or tones down the normal light-refracting, light-diffusing properties which the microbead composition has in the absence of the rubber particles, but the formed compositions such as coatings or paints are aesthetically-attractive since they exhibit a depth of color, particularly when pigmented black or gray or silver and used as automobile paints.

More importantly, the present compositions exhibit excellent affinity for substrates to which they are applied, such as by spray painting, and bond strongly thereto when dried and/or heat-cured /or baked. Similarly, the microparticles are strongly bonded

within the formed compositions by the resinous binder material and are resistant to separation therefrom, which can result in cracking, and flaking of the coating. It is unclear how or why the rubber microparticles modify the present compositions to improve the affinity of the glass microbeads for the resinous binder material and to increase the affinity of the coating composition or paint for substrates, but it appears that the rubber particles have a greater affinity for the resinous binder material and for the glass microbeads than these materials have for each other, thereby linking these materials to each other and to the coated substrates.

The present compositions are formulated as high solids content, heat-curable, compositions containing embedded or encapsulated light-refractive colorless and/or tinted transparent glass, beads, preferably between about 10 to 20 microns diameter, most preferably between about 12 and 18 μ , rubber microparticles up to about 150 μ diameter, and one or more color-enhancing agents such as pigments, dyes, aluminum flakes, colored flakes, phosphorescent glass beads and similar light-enhancing agents. Alternatively, some of the color enhancing agents may be present in a colored base coating over which the glass bead-embedded coating composition is applied, to cause light reflected by the base coat to be refracted and dissipated across the transparent glass bead layer, whereby the intensity and richness of the color

or appearance of the combined layers is substantially enhanced.

While the present compositions may contain some beads which are opaque and/or retroreflective, such as hemispherically- or fully-metallized glass beads, or phosphorescent-coated beads, it is essential that a substantial content of the beads comprises light-reflective, clear or tinted glass beads which function as light diffusers within the semi-opaque translucent composition or layer to scatter direct and indirect light, including colored light, in all directions across the composition or layer.

The scattered light may have the color of a reflective base layer, or may become colored or enhanced by absorption and/or reflection by the rubber particles and/or by a color-enhancing ingredient also embedded within the beaded paint layer, such as metal flakes, mica, pigment, metallized beads or glass beads containing color, pigment, luminescent or phosphorescent coatings, holographic flakes or similar color enhancing additives. The present light-refractive compositions such as paint layers scatter light across the paint layer, depending upon their degree of translucency, due to the content of fully-embedded transparent or translucent beads, and do not merely retro-reflect or focus applied light directly back to the source. To the contrary, the translucent glass beads refract direct and indirect light in all directions through the paint layer, to enhance the

depth and richness of the color(s) of the paint layer or the underlying base layer.

Please replace the paragraph beginning on page 7, line 33 through page 8, line 7 as rewritten below:

The present compositions may be water-borne or aqueous compositions comprising a water soluble heat-curable, cross-linking binder material such as an acrylic acid ester resin, a methacrylic acid ester resin, a polyurethane polymer, or the like, the pelletized rubber, the microbead mixture comprising clear or translucent refractive beads and color enhancers such as pigmented, dyed, phosphorescent or luminescent reflective beads, pigments, metal flakes, mica, holographic flakes, etc.

Please replace the paragraph beginning on page 8, line 19 through page 8, line 31 as rewritten below:

The most critical component of the present light-transmissive compositions is the mixture of pelletized rubber, and resinous binder/microbeads material. The microbeads comprise (a) translucent, preferably transparent, optically-clear, light-refracting microbeads; optionally (b) one or more color-enhancing additives such as reflective microbeads which are coated with or encapsulate a reflective material, such as aluminum microbeads or aluminum-coated glass microbeads, or which are coated with or encapsulate colored dye or pigment or luminescent or phosphorescent materials, or consist of pigments,

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dyes, metal flake, mica or holographic flake, to lend color, depth and intensity to the compositions.